962,683.

M. WALKER.

DYNAMO ELECTRIC MACHINE.

APPLICATION FILED JUNE 5, 1905.

Patented June 28, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

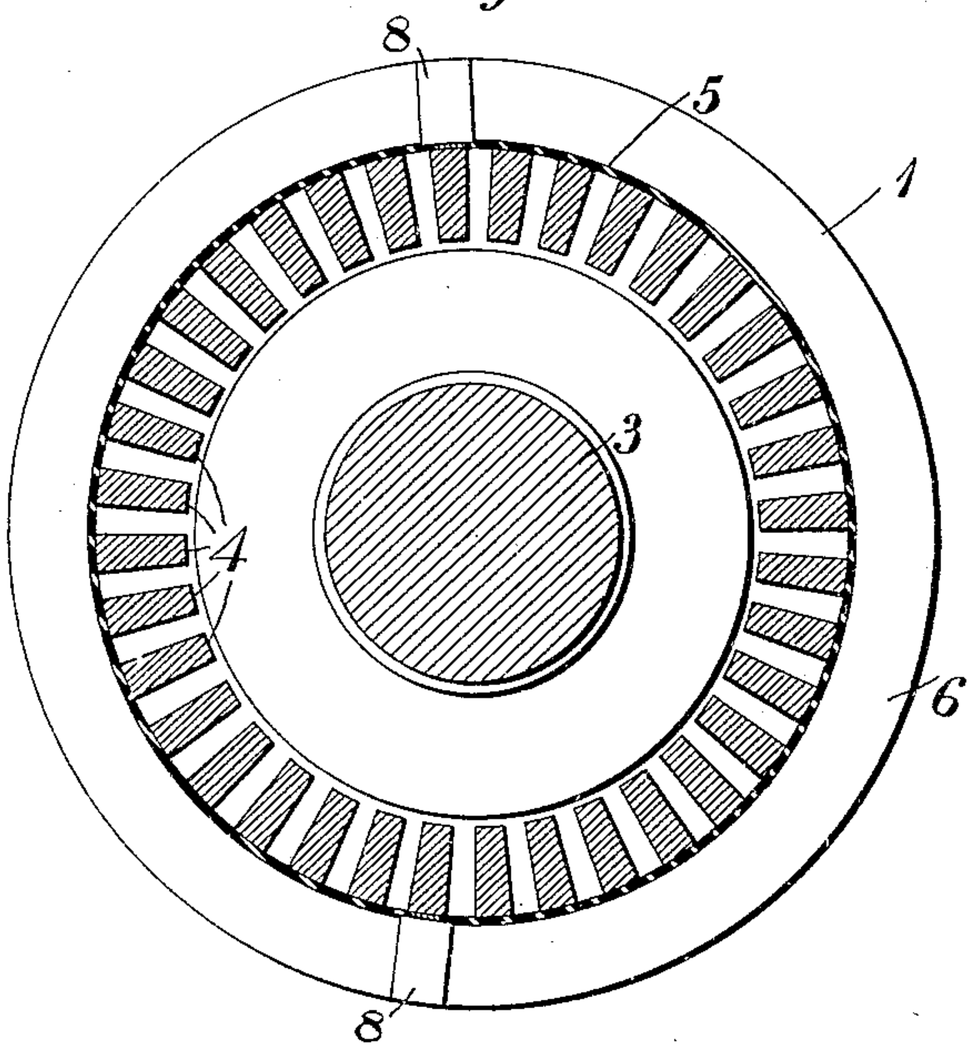
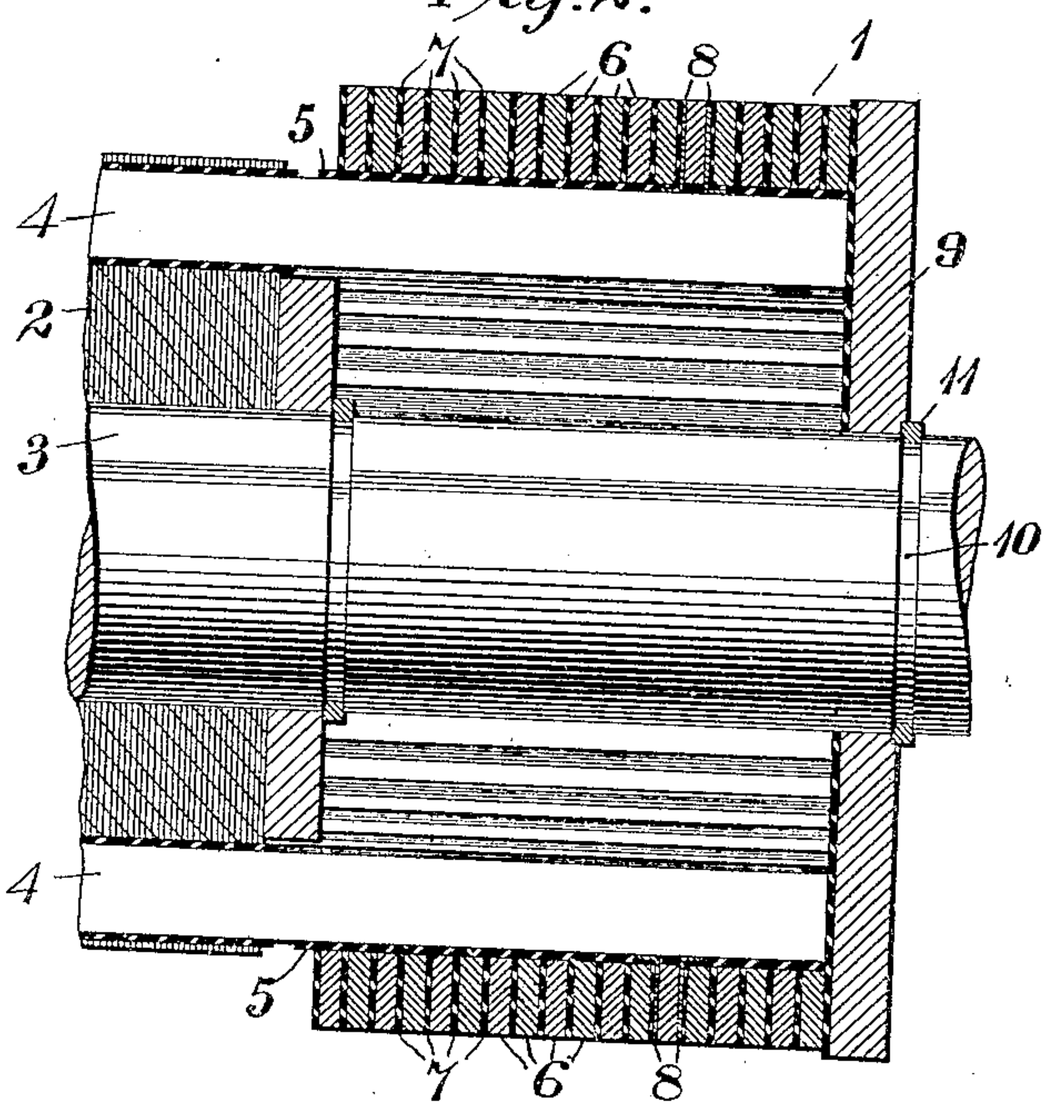


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

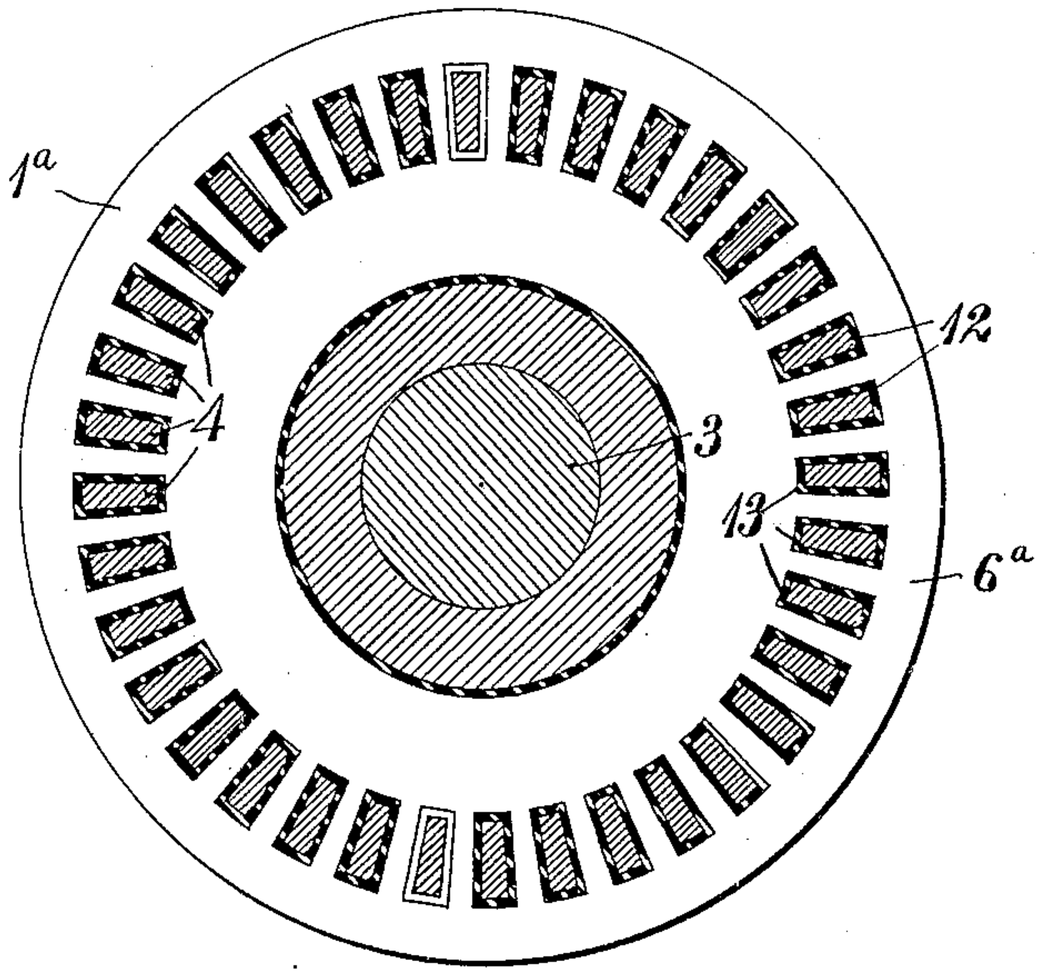
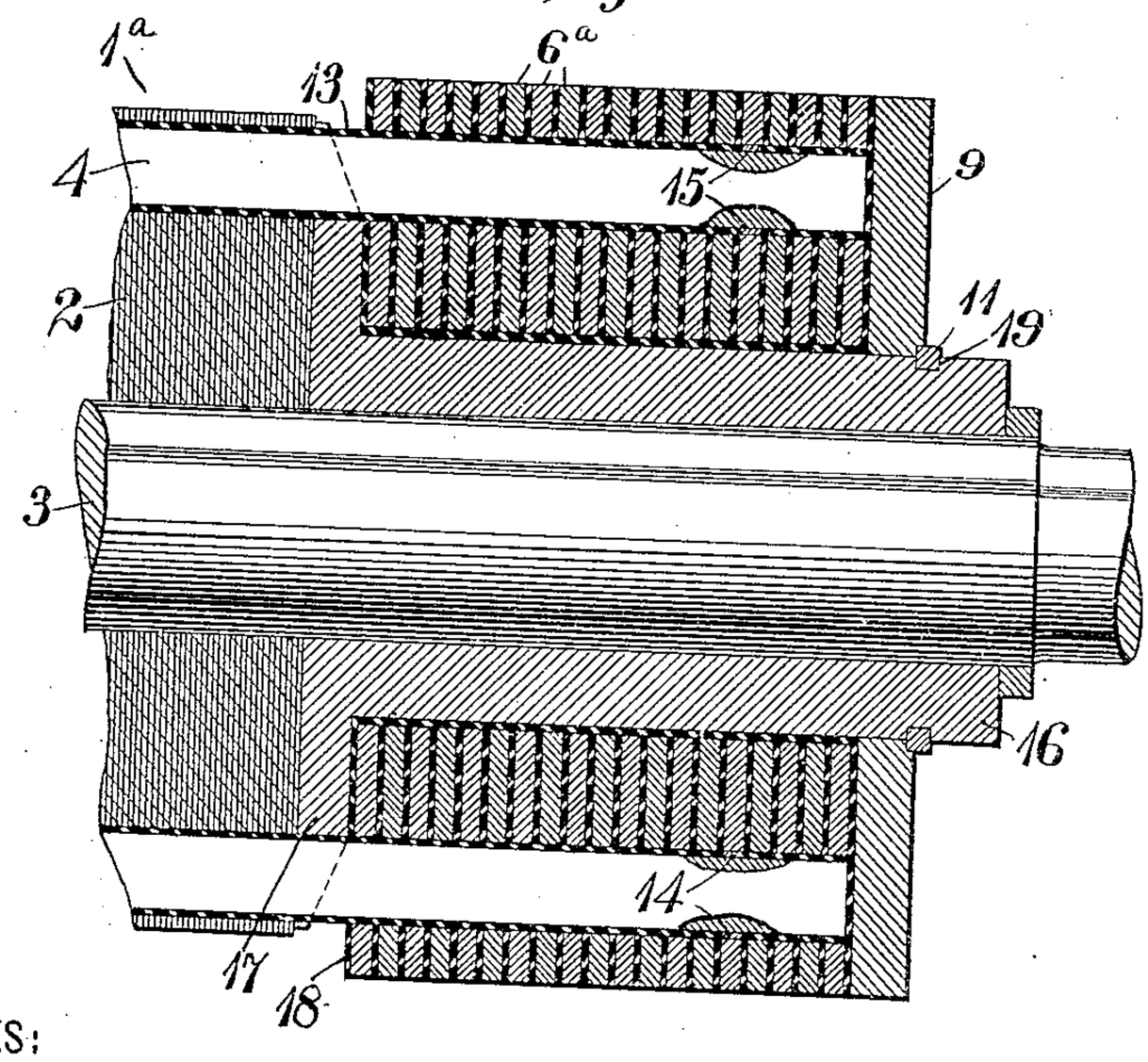


Fig. 4.



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MILES WALKER, OF MANCHESTER, ENGLAND, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

DYNAMO-ELECTRIC MACHINE.

962,683. Specification of Letters Patent. **Patented June 28, 1910.**

Application filed June 5, 1905. Serial No. 263,772.

To all whom it may concern:

Be it known that I, MILES WALKER, a subject of the King of Great Britain, and a resident of Manchester, England, have invented a new and useful Improvement in Dynamo-Electric Machines, of which the following is a specification.

My invention relates to dynamo electric machines and particularly to the rotating parts of machines, such as turbo generators, which operate at high speeds.

The object of my invention is to provide a rotating part for a high speed machine which shall be so constructed that it will permanently retain its dynamical balance and none of the parts of which will be injured or displaced by the centrifugal forces which are incident to high speed operation.

Some difficulties have been encountered in the design and construction of the rotating members of dynamos intended for high speed operation, because of liability to displacement and distortion of parts under centrifugal stresses and consequent disturbance of the dynamical balance that is necessary for proper and successful operation.

In order to overcome these difficulties I propose to employ end connectors for the portions of the conductors which project beyond the core slots that are of such form and dimensions as to maintain both themselves and the projecting ends of the conductors in dynamical balance and at the same time to employ a single layer only of insulating material which is subjected to the high centrifugal force and to thereby avoid all danger of disturbance of the desired dynamical balance of the machine.

In the accompanying drawings, Figure 1 is a transverse, sectional view of the rotating part of a machine constructed in accordance with my invention. Fig. 2, is a longitudinal, sectional view of the structure shown in Fig. 1, a portion of the member being broken away, and Fig. 3 is a view corresponding to Fig. 1 but illustrating a modification, and Fig. 4 is a view to correspond to Fig. 2 and illustrating the modification shown in Fig. 3.

Referring first to Figs. 1 and 2, the rotating member 1 of a dynamo electric machine is shown as comprising a laminated core 2, the laminæ of which are assembled upon a shaft 3 and the bar conductors 4 of which project a considerable distance from the ends of the slots in which they are located. The outer surfaces of the propecting ends of the bars 4, which are jointly of cylindrical contour, are surrounded by a thin cylinder 5, which may be formed of suitable, hard, insulating material such as micanite or equivalent composition or, if desired, a strip of such insulating material may be placed upon the outer surface of each of the bars 4.

In order to suitably connect the projecting ends of the bars 4 to form a magnetizing winding for the core 2, I provide end connectors 6 in the form of rings which are shrunk or pressed over the insulation 5 so as to surround the ends of all of the bars 4, the number of rings, of course, depending upon the number of end connections necessary to provide a proper magnetizing winding. Each of the rings 6 is properly insulated from the adjacent rings by means of annular plates or strips 7, of suitable non-conducting material. At suitable points, electrical connection is made between the rings 6 and the proper bars 4, the means for making such connection being here shown as flexible strips 8 of sheet copper which are bent to the proper form and suitably joined to the bars and to the connector rings.

Endwise displacement of the connector rings is prevented by means of an end plate 9 which may be suitably fastened in position upon the shaft 3, a groove 10 in the shaft and a locking ring 11 being here shown as constituting such fastening means.

It will be seen that the connector rings serve to prevent the ends of the bars 4 from flying outwardly when the rotating member is operating at high speeds and at the same time serve as suitable end connectors for the bars. Each connector ring is dynamically balanced before it is placed in position and consequently the structure may be operated at the desired speeds without vibration of the parts and consequent injury to the insulation, the rings and the bars.

Referring now to Figs. 3 and 4, the machine 1^a is provided with a laminated core 2 mounted upon a shaft 3 and provided with slots in which are located bar conductors 4, all substantially as shown in Figs. 1 and 2 and hereinbefore described. In the present case, however, the end connectors 6^a are made of such width that they may be provided with apertures 12 of the proper form, location and dimensions to receive the

projecting ends of the bars 4, each of the bars being provided with a sheath 13, of suitable insulating material in order to prevent electrical contact between the bars and the rings except at the proper points where the insulation is removed and a soldered or other suitable connection is made between the proper bars and rings in order to provide a complete magnetizing winding. Two of the points of electrical connection between the bars and rings are indicated at 14 and 15.

The rings are here shown as mounted upon a sleeve or cylinder 16 having an annular flange 17 at its inner end that rests against the core 2 and between this cylinder or sleeve and the rings 6^a is located a bushing 18 of suitable insulating material. By making the connecting rings of proper width, the cylinder 16 might be omitted and the bushing 18 be fitted directly to the shaft 3.

The end plate 9 is here shown as fastened in position by a locking ring 11, substantially in accordance with what is shown in Fig. 2, except that the groove 19 for the reception of the ring, is in this case, formed in the cylinder 16.

Other modifications in structural details may, of course be made, if desired, within the spirit and scope of my invention.

I claim as my invention:

1. In a dynamo electric machine, a rotary member having a slotted core, bar conductors located in the core slots and projecting beyond the ends thereof, and a plurality of connecting rings of the same size and form, insulated from each other and embracing all of the projecting ends of the bar conductors and severally and collectively dynamically balanced.

2. In a dynamo electric machine, a rotating member having a laminated slotted core, bar conductors of substantially uniform length located in and projecting beyond the ends of the core slots, a plurality of side-by-side connecting rings surrounding the projecting ends of the conductors and insulated therefrom and from each other and so electrically connected to the bars as to constitute therewith a complete magnetizing winding.

3. In a dynamo electric machine, the combination with a rotatable member having a slotted core, bar conductors of substantially uniform length located in the core slots and projecting beyond the ends of the same, connector rings having perforations to receive the projecting ends and insulated from each other and from the bars except at such points as will serve to connect the bars into a complete magnetizing winding.

4. In a dynamo electric machine, a rotatable member having a slotted core, conductors of substantially uniform length located in and projecting beyond the core slots, a plurality of conducting rings provided with perforations to receive and fit such projecting conductor ends, means for insulating the rings from each other and from the conducting bars and means for electrically connecting the rings to the bars in such order as to provide a complete magnetizing winding for the core.

5. In a dynamo electric machine, a rotatable member comprising a shaft, a slotted core mounted thereon, a sleeve supported upon the shaft adjacent to the end of said core, bar conductors of substantially uniform length located in and projecting beyond the core slots, a set of rings provided with perforations to receive the projecting ends of the bar conductors, insulation interposed between the rings and the sleeve and between the rings and the bar conductors, and means for electrically connecting the rings and the conductors in such order as to provide a complete magnetizing winding for the core.

6. In a dynamo-electric machine, a rotary member having a slotted core, straight conducting bars of substantially uniform length located in the core slots and projecting beyond the ends thereof, a plurality of side-by-side connecting rings surrounding said projecting ends and so electrically connected thereto as to provide a complete magnetizing winding, and an end plate clamped against the ends of the bars and the outermost connecting ring.

In testimony whereof, I have hereunto subscribed my name this twenty second day of May 1905.

MILES WALKER.

Witnesses:
JOHN MCCAMBRIDGE,
OSCAR WILLIAM LENILLETTE.